

TRANSMITTAL LETTER TO THE UNITED STATES  
DESIGNATED/ELECTED OFFICE (DO/EO/US)  
CONCERNING A FILING UNDER 35 U.S.C. 371

D078 1170.1

U.S. APPLICATION NO. (IF KNOWN, SEE 37 CFR

Not Yet Assigned 10/088983

INTERNATIONAL APPLICATION NO.

PCT/EP00/09830

INTERNATIONAL FILING DATE

6 OCTOBER 2000

PRIORITY DATE CLAIMED

6 OCTOBER 1999

TITLE OF INVENTION

LINOLEUM FLOOR COVERING

APPLICANT(S) FOR DO/EO/US

UTA SZERREIKS and MARKUS BAUM

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

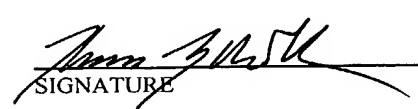
1. ☒ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
3. ☐ This is an express request to begin national examination procedures (35 U.S.C. 371(f)). The submission must include items (5), (6), (9) and (24) indicated below.
4. ☐ The US has been elected by the expiration of 19 months from the priority date (Article 31).
5. ☒ A copy of the International Application as filed (35 U.S.C. 371 (c) (2))
  - a. ☒ is attached hereto (required only if not communicated by the International Bureau).
  - b. ☐ has been communicated by the International Bureau.
  - c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US).
6. ☒ An English language translation of the International Application as filed (35 U.S.C. 371(c)(2)).
  - a. ☒ is attached hereto.
  - b. ☐ has been previously submitted under 35 U.S.C. 154(d)(4).
7. ☒ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371 (c)(3))
  - a. ☐ are attached hereto (required only if not communicated by the International Bureau).
  - b. ☐ have been communicated by the International Bureau.
  - c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
  - d. ☒ have not been made and will not be made.
8. ☐ An English language translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).
9. ☒ An oath or declaration of the inventor(s) (35 U.S.C. 371 (c)(4)).
10. ☒ An English language translation of the annexes of the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371 (c)(5)).
11. ☒ A copy of the International Preliminary Examination Report (PCT/IPEA/409).
12. ☒ A copy of the International Search Report (PCT/ISA/210).

## Items 13 to 20 below concern document(s) or information included:

13. ☒ An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
14. ☐ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
15. ☒ A **FIRST** preliminary amendment.
16. ☐ A **SECOND** or **SUBSEQUENT** preliminary amendment.
17. ☐ A substitute specification.
18. ☐ A change of power of attorney and/or address letter.
19. ☐ A computer-readable form of the sequence listing in accordance with PCT Rule 13ter.2 and 35 U.S.C. 1.821 - 1.825.
20. ☐ A second copy of the published international application under 35 U.S.C. 154(d)(4).
21. ☐ A second copy of the English language translation of the international application under 35 U.S.C. 154(d)(4).
22. ☒ Certificate of Mailing by Express Mail
23. ☒ Other items or information:

PCT/ISA/220 Cited References

PCT/IPEA/416 Postcard

U.S. APPLICATION NO. (IF KNOWN, SEE 37 CFR 1.445(a)(2)) <b>107088983</b>		INTERNATIONAL APPLICATION NO. <b>PCT/EP00/09830</b>		ATTORNEY'S DOCKET NUMBER <b>D078 1170.1</b>	
24. The following fees are submitted: <b>BASIC NATIONAL FEE ( 37 CFR 1.492 (a) (1) - (5) ) :</b> <input type="checkbox"/> Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO and International Search Report not prepared by the EPO or JPO ..... <b>\$1000.00</b> <input checked="" type="checkbox"/> International preliminary examination fee (37 CFR 1.482) not paid to USPTO but International Search Report prepared by the EPO or JPO ..... <b>\$890.00</b> <input type="checkbox"/> International preliminary examination fee (37 CFR 1.482) not paid to USPTO but international search fee (37 CFR 1.445(a)(2)) paid to USPTO ..... <b>\$710.00</b> <input type="checkbox"/> International preliminary examination fee (37 CFR 1.482) paid to USPTO but all claims did not satisfy provisions of PCT Article 33(1)-(4) ..... <b>\$690.00</b> <input type="checkbox"/> International preliminary examination fee (37 CFR 1.482) paid to USPTO and all claims satisfied provisions of PCT Article 33(1)-(4) ..... <b>\$100.00</b> <b>ENTER APPROPRIATE BASIC FEE AMOUNT =</b> <b>\$890.00</b>				<b>CALCULATIONS PTO USE ONLY</b>	
Surcharge of <b>\$130.00</b> for furnishing the oath or declaration later than <input type="checkbox"/> 20 <input type="checkbox"/> 30 months from the earliest claimed priority date (37 CFR 1.492 (e)).				<b>\$0.00</b>	
<b>CLAIMS</b>		<b>NUMBER FILED</b>		<b>NUMBER EXTRA</b>	
Total claims		12 - 20 =		0	
Independent claims		1 - 3 =		0	
Multiple Dependent Claims (check if applicable).				<input type="checkbox"/>	
<b>TOTAL OF ABOVE CALCULATIONS =</b>				<b>\$890.00</b>	
<input type="checkbox"/> Applicant claims small entity status. (See 37 CFR 1.27). The fees indicated above are reduced by 1/2.				<b>\$0.00</b>	
<b>SUBTOTAL =</b>				<b>\$890.00</b>	
Processing fee of <b>\$130.00</b> for furnishing the English translation later than <input type="checkbox"/> 20 <input type="checkbox"/> 30 months from the earliest claimed priority date (37 CFR 1.492 (f)).				<b>\$0.00</b>	
<b>TOTAL NATIONAL FEE =</b>				<b>\$890.00</b>	
Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31) (check if applicable).				<input type="checkbox"/> <b>\$0.00</b>	
<b>TOTAL FEES ENCLOSED =</b>				<b>\$890.00</b>	
				<b>Amount to be: refunded \$</b>	
				<b>charged \$</b>	
a. <input checked="" type="checkbox"/> A check in the amount of <b>\$890.00</b> to cover the above fees is enclosed.					
b. <input type="checkbox"/> Please charge my Deposit Account No. _____ in the amount of _____ to cover the above fees. A duplicate copy of this sheet is enclosed.					
c. <input checked="" type="checkbox"/> The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. <b>09-0528</b> A duplicate copy of this sheet is enclosed.					
d. <input type="checkbox"/> Fees are to be charged to a credit card. <b>WARNING:</b> Information on this form may become public. <b>Credit card information should not be included on this form.</b> Provide credit card information and authorization on PTO-2038.					
<b>NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.</b>					
<b>SEND ALL CORRESPONDENCE TO:</b>					
<div>Thomas B. McGurk, Esq. Womble Carlyle Sandridge &amp; Rice PLLC P.O. Box 7037 Atlanta, Georgia 30357-0037  (404) 872-7000 (Telephone) (404) 888-7490 (Facsimile)</div> <div> SIGNATURE <b>Thomas B. McGurk</b> NAME <b>44,920</b> REGISTRATION NUMBER <b>3/26/02</b> DATE</div>					

10088983 10/088983

JC05 Rec'd PCT/PTO 26 MAR 2002

Patents

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re Application of: )  
Szerreiks et al. )  
For: **LINOLEUM FLOOR COVERING** )

**CERTIFICATE OF EXPRESS MAIL**

Honorable Commissioner for Patents  
Box PCT  
Washington, D.C. 20231

Sir:

Enclosed for filing in the above case are the following documents:

Transmittal Letter for designated/elected office (DO/EO/US) under 371;  
Preliminary Amendment;  
International patent application;  
English translation of International Application;  
Unsigned Declaration and Power of Attorney;  
Form PCT/ISA/220;  
Form PCT/ISA/210;  
Form PCT/IPEA/409;  
Form PCT/IPEA/416;  
IDS and Form PTO-1449;  
Check No. 029197;  
Return Postcard

Respectfully submitted,



Thomas B. McGurk  
Reg#44,920

P.O. Box 7037  
Atlanta, GA 30357-0037  
404-962-7524

Docket Number: **DO78 1170.1**

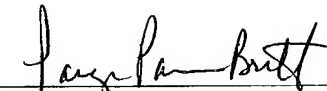
I hereby certify that all correspondences listed above are being deposited for delivery to the above addressee, with the United States Postal Service "**EXPRESS MAIL POST OFFICE TO ADDRESSEE**" service under 37 CFR 1.10 on the date indicated below:

The envelope has been given U.S. Postal Service "Express Mail Post Office To Addressee" Package #**EL759080904US**.

Date: March 26, 2002

Paige Parson Britt

(Printed Name of Person Mailing Correspondence)  
Correspondence)



(Signature of Person Mailing

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In Re Application of:	)	
	)	
Uta Szerreiks and Markus Baum	)	Examiner: Unknown
	)	
Serial No.: To Be Determined	)	Art Unit: Unknown
	)	
(National Phase of PCT/EP00/09830)	)	
	)	
Filed: Herewith	)	
	)	
For: LINOLEUM FLOOR COVERING	)	Docket No.: D078 1170.1
	)	

PRELIMINARY AMENDMENT

Assistant Commissioner for Patents  
Box PCT  
Washington, D.C. 20231

Sir:

This is a preliminary amendment to the national stage application filed herewith claiming priority under 35 U.S.C. §119(b) to a German application, serial no. 19948406.6, filed on October 6, 1999 and PCT application, serial no. PCT/EP00/09830, filed on October 6, 2000 under 35 U.S.C. §363. Please amend the accompanying application as follows.

IN THE SPECIFICATION

After the title insert the following:

This application claims priority under 35 U.S.C. §119(b) to German Application Serial No. 19948406.6, filed on October 6, 1999 and PCT Application Serial No. PCT/EP00/09830, filed on October 6, 2000 under 35 U.S.C. §363.

IN THE CLAIMS

Please amend claims 1-12 as follows.

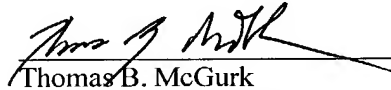
1. (Amended) An electrically conductive floor covering based on linoleum, comprising a wear layer, a lower layer, and a backing, wherein the wear layer comprises 0.1% to 5% by weight carbon black or 0.1% to 8% by weight metal powder in relation to the total weight of the wear layer or a combination thereof, wherein the lower layer contains at least one electrically conductive filler material, wherein the electrically conductive filler material includes 1% to 20% by weight carbon black or 1.5% to 40% metal powder in relation to the conductive mixed mass or a combination thereof, and wherein the floor covering has a contact resistance  $R_1$  per EN 1081 (April 1998) of a maximum of  $10^7 \Omega$ .
2. (Amended) The floor covering according to Claim 1, wherein the lower layer has a thickness of 0.6 mm to 1.4 mm.
3. (Amended) The floor covering according to Claim 1, wherein the wear layer comprises a chemical additive for increasing conductivity.
4. (Amended) The floor covering according to Claim 3, wherein the chemical additive is selected from derivatives of imidazol, imidazolin, benzimidazol, morpholin and mixtures thereof.

- 5.(Amended) The floor covering according to Claim 1, wherein the wear layer has a bright color.
6. (Amended) The floor covering according to Claim 1, wherein the wear layer has a multicolor pattern.
7. (Amended) The floor covering according to Claim 1, wherein the wear layer has a thickness of 1.4 mm to 3.6 mm.
- 8.(Amended) The floor covering according to Claim 1, further including an electrically conductive web arranged on the side of the backing facing away from the lower layer.
- 9.(Amended) The floor covering according to Claim 8, wherein the electrically conductive web comprises an electrically conductive filler material.
- 10.(Amended) A method for producing a floor covering based on linoleum according to Claim 1 comprising  
applying the lower layer onto the backing; and  
forming the wear layer on the lower layer.
- 11.(Amended) The method according to Claim 10, further including applying a back coating in the form of an electrically conductive web to the back side of the floor covering.
- 12.(Amended) The method according to Claim 11, wherein the back coating is applied through a press process.

REMARKS

Applicant respectfully requests examination of the national stage filing of the PCT application enclosed herewith. Applicant further respectfully requests that the above amendment be entered into said application.

Respectfully submitted

  
Thomas B. McGurk  
Registration No. 44,920  
James F. Vaughan  
Registration No. 31,889

WOMBLE CARLYLE SANDRIDGE & RICE

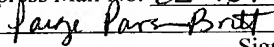
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EXPRESS MAIL

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MARCH 26, 2002

Express Mail No. EL 759 080 904



Signature

*Version with Markings to Show Changes Made*

**IN THE SPECIFICATION**

After the title insert the following:

This application claims priority under 35 U.S.C. §119(b) to German Application Serial No. 19948406.6, filed on October 6, 1999 and PCT Application Serial No. PCT/EP00/09830, filed on October 6, 2000 under 35 U.S.C. §363.

**IN THE CLAIMS**

Please amend claims 1-12 as follows.

1. (Amended) An [E]electrically conductive floor covering based on linoleum, comprising a wear layer [(2)], a lower layer [level (3)], and a backing [(4)], [with] wherein the wear layer [(2) comprising] comprises 0.1% to 5% by weight carbon black [and/]or 0.1% to 8% by weight metal powder in relation to the total weight of the wear layer [(2)] or a combination thereof, [with] wherein the lower layer [(3)containing as] contains at least one electrically conductive filler material, wherein the electrically conductive filler material includes 1% to 20% by weight carbon black [and/]or 1.5% to 40% metal powder in relation to the conductive mixed mass or a combination thereof, [with] and wherein the floor covering [having] has a contact resistance  $R_1$  per EN 1081 (April 1998) of a maximum of  $10^7 \Omega$ .
2. (Amended) The [F]floor covering according to Claim 1, [with] wherein the lower layer [(3) having] has a thickness of 0.6 mm to 1.4 mm.



3. (Amended) The [F]floor covering according to Claim 1 [or 2], [with] wherein the wear layer [(2) comprising] comprises a chemical additive for increasing conductivity.
- 4.(Amended) The [F]floor covering according to Claim 3, [with] wherein the chemical additive [being] is selected from [morpholin and/or at least a derivative] derivatives of imidazol, imidazolin, [or] benzimidazol [or a mixture], morpholin and mixtures thereof.
- 5.(Amended) The [F]floor covering according to [one of the preceding claims] Claim 1, [with] wherein the wear layer [(2) having] has a bright color.
6. (Amended) The [F]floor covering according to [one of the preceding claims] Claim 1, [with] wherein the wear layer [(2) as such having] has a multicolor pattern.
7. (Amended) The [F]floor covering according to [one of the preceding claims] Claim 1, [with] wherein the wear layer [(2) having] has a thickness of 1.4 mm to 3.6 mm.
- 8.(Amended) The [F]floor covering according to [one of the preceding claims] Claim 1, [with] further including an electrically conductive web [(5) being] arranged on the side of the backing [(4)] facing away from the lower layer [(3)].
- 9.(Amended) The [F]floor covering according to Claim 8, [with] wherein the electrically conductive web [(5) comprising] comprises an electrically conductive filler material.

10.(Amended) A [M]method for producing a floor covering based on linoleum according to

[one of] Claim[s] 1 [through 9] comprising

[-] [the application of] applying the lower layer [(3)] onto the backing [(4)]; and

[-] [the] forming [of] the wear layer [(2)] on the lower layer [(3)].

11.(Amended) The [M]method according to Claim 10, further including applying a [with at

least one] back coating in the form of an electrically conductive web [(5) being

applied] to the back side of the floor covering.

12.(Amended) The [M]method according to Claim 11, [with] wherein the [web-like] back

coating [(5) being] is applied through a press process.

## Linoleum Floor Covering

## Description

This invention concerns an electrically conductive floor covering based on linoleum which comprises a wear layer and an under layer, with the floor covering having an electrical contact resistance  $R_1$  in accordance with EN 1081 of a maximum of  $10^7 \Omega$ , and a method for producing the floor covering.

The market increasingly is demanding PVC-free, light-colored floor coverings with a low electrical resistance, in particular with a contact resistance  $R_1$  of a maximum of  $10^7 \Omega$  (contact resistance per EN 1081 or electrical leakage resistance  $R_A$  per DIN 51 953). Currently this demand is met only by electrically conductive rubber floor coverings. Such PVC-free, electrically conductive floor coverings based on rubber are described, for example, in DE 34 40 572 A1, DE 196 49 708 A1, and DE 35 45 760 A1.

Recently, however, there has been a heightened demand for floor coverings based on renewable raw materials, the classic example of which is linoleum floor coverings. A conventional linoleum floor covering has a relatively high electrical resistance of around  $> 10^{10} \Omega$ . Therefore such a linoleum floor covering cannot be used in rooms, the floor covering of which must have a certain electrical leakage resistance, such as, for example, in operating rooms of hospitals, laboratories, and computer rooms. Known for such applications is the reducing of contact resistance of the linoleum floor covering through the addition of electrically conductive fillers such as special carbon blacks. The addition of special carbon black, however, has the drawback that the use properties of the linoleum floor covering is deteriorated as a result of the relatively large quantity of carbon black required to achieve adequate electrical conductivity. Second, with the addition of carbon black to the linoleum mixture, possibilities for coloring are practically not



electrically conductive floor coverings that essentially have a light color tone throughout.

One objective of the present invention therefore is to provide a linoleum strip suitable as floor covering which has a low contact resistance  $R_1$ , in particular a contact resistance  $R_1$  of a maximum of  $10^7 \Omega$  which in addition is not as strongly independent [sic] on air humidity, and at the same time has a bright color ton. An additional task of the present invention is to indicate a method with which such a linoleum floor covering can be produced.

These objectives are solved with the objects characterized in the claims.

In particular a floor covering based on linoleum is provided that is electrically conductive and that has a wear layer (2) and an under layer (3), with the floor covering having an electrical contact resistance  $R_1$  of a maximum of  $10^7 \Omega$  per EN 1081.

For determining the electrical resistance of floor coverings the following values are defined by EN 1081, which replaced DIN 51 953:

1. The contact resistance  $R_1$  per EN 1081, which corresponds to leakage resistance  $R_A$  per DIN 51 953, is the electrical resistance of a floor covering measured on a sample between the tripod electrode on the surface of the floor covering and an electrode on the underside directly opposite it.
2. In contrast, according to EN 1081, resistance to ground  $R_2$ , corresponding to resistance to ground  $R_E$  per DIN 51 953, is the electrical resistance of a floor covering measured on an installed

floor covering between a tripod electrode pressed onto the upper surface and ground.

Designated in the state of the art as "electrically conductive" floor coverings are floor coverings which have resistance to ground  $R_2$  measured according to EN 1081 of  $< 10^9 \Omega$ .

According to the invention, the floor covering has a contact resistance  $R_1$  of a maximum of  $10^7 \Omega$  measured according to EN 1081. Also the resistance to ground  $R_2$  of the floor covering is preferably a maximum of  $10^7$  measured according to EN 1081.

The figures show the following:

Figure 1 shows a depiction of a schematic cross section through a floor covering (1) according to a preferred embodiment of the present invention along line A-A of Figure 2. Arranged on a backing (4) are a wear layer (2) and an under layer (3). Particles (6) can be dispersed in the wear layer which comprise a conductive filler material. Arranged on the side of backing (4) facing away from lower layer (3) in this embodiment is a conductivity web (5).

Figure 2 shows a schematic view of the underside of a floor covering (1) according to an embodiment of the present invention. Arranged on the side of backing (4) facing away from the lower layer is a conductivity web (5). During the installation of the floor covering, this web (5) can, for example, be connected to a copper strip tab (7) by means of which the floor covering is grounded through connecting to ground.

The floor covering according to the invention has a lower layer based on linoleum and a wear layer or top layer based on linoleum. The

floor covering preferably has an overall thickness of around 2 mm to around 6 mm, in particular around 2 mm to 4 mm.

According to the invention, the electrical conductivity of the lower layer preferably is achieved through mixing at least one electrically conductive filler material into the linoleum raw mixture. Carbon black and metal powder are preferred as electrically conductive filler materials, with it being possible to use a filler material alone or in combination. In the case of use of carbon black as conductive material, depending on carbon black type, the concentration is preferably about 1% to 20% by weight, more especially preferred about 3% to 15% by weight, in relation to the weight of the conductive mixed mass. By way of example, Ketjenblack® EC-300J (Akzo Nobel), Printex® XE 2 (Degussa AG) or one or several other commercially available carbon blacks can be used as carbon black. In the case of use of metal powder as conductive material, the concentration is about 1.5% to 40% by weight, in relation to the weight of the conductive mixed mass. The quantity used is geared to the density and particle size of the metal powder. By way of example, aluminum, bronze, and VA powder can be used. Any arbitrary mixture of carbon black and one or more metal powders as well as a single metal powder or a mixture of several metal powders can be used. The quantity relationships in mixtures of carbon black and metal powder are to be selected such that contact resistance  $R_1$  of the lower layer, which in the floor covering is in contact with the wear layer, is preferably  $\leq 10^7 \Omega$  (EN 1081), still more preferred  $\leq 10^5 \Omega$  (EN 1081).

The lower layer can contain other chemical additives which further improve the conductivity of the linoleum. By way of example, chemical additives of this kind as well as examples of use quantities are described below in association with composition and can be used analogously in the lower layer.

In addition to the aforementioned additives, the lower layer has conventional composition. In particular conventional additives such as processing enhancers, antioxidants, UV stabilizers, lubricants, and the like can be contained in the mixed mass which can be selected depending on the binder.

The lower layer preferably has a thickness of 0.6 mm to 1.4 mm.

The wear layer or upper layer of the floor covering according to the invention is the visible surface in the installed floor covering. According to the invention it can have a higher contact resistance  $R_1$  than the lower layer and preferably contains only slight quantities of conductive filler material. A degree of conductivity of the wear layer can be achieved through essentially colorless chemical additives in the linoleum base mass for the wear layer. Preferably morpholin and/or at least one derivate of imidazol, imidazolin, or benzimidazol or a mixture thereof are used as chemical additive. Preferably the chemical additive is worked into the linoleum raw mass in a quantity of 0.5% to 15% by weight, more preferably in a quantity of 4% to 10% by weight in relation to the total weight of the linoleum mass of the wear layer. In the case of the use of chemical additives of this kind, in a preferred embodiment of the invention diatomite, which is also often designated siliceous earth, can be used as a sorbent. Preferably 3% to 5% by weight diatomite in relation to the weight of the linoleum mixed mass is used.

According to the invention, the wear layer can have a bright color and have a plain color or a multicolor pattern. In the wear layer, preferably in place of the decorative color which is provided proportionately in the lowest quantity, an electrically conductive filler such as carbon black and/or metal powder and/or conductive fibers or a mixture thereof are added.



Conductive fibers in the meaning of the invention are in particular graphitized synthetic fibers or synthetic fibers which are jacketed with epoxy-graphitized material. Conductive fibers of this kind can be produced through addition of graphite into the synthetic itself or through sheathing of small synthetic particles with graphite, and in most cases have a gray coloration. As a result of their small dimensions and low additive quantities, however, they appear almost colorless to the human eye.

In the wear layer, there is preferably 0.1% to 5% by weight, especially preferred 0.1% to 2% by weight carbon black and/or 0.1% to 8% by weight, especially 0.1% to 3% by weight metal powder. Through additions of this kind in small quantities, the conductivity of the linoleum wear layer can be improved to below  $10^7 \Omega$ . Furthermore, as a result of this small proportion of electrically conductive filler in the wear layer and with the addition of the above mentioned chemical additives, the contact resistance R1 surprisingly is no longer so strongly dependent on the air humidity.

In addition, the upper layer comprises the usual components for linoleum floor coverings such as binding agents (so-called bedford cement or B cement from a partially oxidized linseed oil and at least one resin as tackifier), at least one filler, and if desired at least one colorant. Ordinarily softwood sawdust and/or cork dust (in the case of simultaneous presence of sawdust and cork dust, typically in a weight ratio of 90:10) and/or chalk, kaolin (China clay), and heavy spar are used as filler. The mixed mass ordinarily contains at least one coloring agent such as a pigment (for example titanium dioxide) and/or other conventional coloring agents based on inorganic and organic colorants. As coloring agents, any natural or synthetic colorants as well as inorganic or organic pigments, alone or in any combination may be used. A typical linoleum composition contains, in relation to the weight of the wear layer, approx. 40% by weight binders

approx. 40% by weight organic fillers, approx. 15% by weight inorganic (mineral) fillers, and approx. 5% by weight coloring agents. Furthermore the usual additives such as processing enhancers, antioxidants, UV stabilizers, lubricants, and the like may be contained in the mixed mass which can be selected depending on the binder.

The wear layer preferably has a thickness of 1.4 mm to 3.6 mm, especially preferred 1.4 mm to 2 mm.

Surprisingly it was determined that the contact resistance of the composite of wear layer and under layer is improved as a result of the conductive under layer compared with the contact resistance of the wear layer. Without wishing to establish a mechanism, it is assumed for this embodiment that the small spreading of a conductive material can serve to a degree as bridges or electrical lines between the surface of the floor covering and the conductive lower layer. As is shown in Figure 1, according to this embodiment form at least some of the spreading of a conductive material (6) or agglomerates of the same extend through the total thickness of wear layer (2) and establish a connection between the surface of the floor covering and the conductive lower layer (3).

As a further advantage of the present invention, the wear layer containing only very low quantities of electrically conductive filler to an extent can lie "protectively" or "compensatingly" above the lower layer. Since the lower layer can contain relatively large quantities of an electrically conductive filler, its mechanical properties are often deteriorated. These deteriorated properties, however, do not come to play in the total composite of the floor covering according to the invention since the wear layer with good mechanical properties lies above the lower level. By way of example, a somewhat brittle lower level can be protected through an elastic wear layer.

Furthermore the linoleum floor covering according to the invention preferably comprises a backing. As backing material, a material on the basis of natural and/or synthetic woven or knitted fabric as well as textile materials can be used. Examples are jute fabric, mixed fabric of natural fibers such as cotton and viscose staple fiber, fiberglass fabric, fiberglass fabric coated with bonding agent, mixed fabric of synthetic fibers, fabric of core/jacket fibers, for example with a core of polyester and a jacket of polyamide. A coating of the fiberglass consisting of styrene-butadiene latex can be used as bonding agents for fiberglass fabric.

According to one embodiment of the present invention, a back coating can be applied to the side of the backing away from the lower layer which is electrically conductive and more preferably is not applied in the form of a continuous coating but rather in the form of a web or strip, preferably of a width of 50 mm to 100 mm and a thickness of 50 mm to 200 mm. This preferably web-shaped back coating extends continuously over the entire length of the floor covering strip. It is in electrical contact with the lower layer and during installation of the floor covering can be contacted by way of example with a copper strip tab which is connected to ground potential so that the floor covering can be grounded. While in the state of the art, electrically conductive special adhesives must be used in laying conductive floor coverings in order to establish contact with ground potential, according to this embodiment of the present invention, it is possible to only connect one copper strip tab bonded to the web-like back coating to ground potential and to use an ordinary adhesive for laying the floor covering.

Advantageously a web-like back coating is also applied as the back side of the floor covering is supplied with a stamped imprint through a printing process. For this purpose aqueous carbon black dispersions and polymer dispersions, for example a latex, can be used which

contain up to 8% by weight, preferably 4% to 6% by weight of an electrically conductive filler, preferably carbon black. In particular this preferably web-like back coating comprises a polymer material which comprises an electrically conductive filler incorporated therein as described above. An electrically conductive filler incorporated within a polymer material has the advantage that the back coating does not rub off.

The present invention also concerns a method for producing the floor covering based on linoleum according to the invention.

For producing the floor covering according to the invention, the conventional methods for producing multiple layer floor coverings can be used.

As a first step, the method according to the invention comprises the application of the linoleum mass of the lower layer to a backing. For this purpose, all of the components for the linoleum mass as described above are mixed in a suitable mixing apparatus, for example a kneader, roll mill, or extruder, into as homogenous as possible base mass (mixed mass). The mixed mass obtained in this manner is added to a roll mill (for example a calendar) and is pressed under pressure and a temperature of ordinarily 10° to 150° C (depending on the recipe and process technology) onto a backing material. During the pressing of the mixed mass onto the backing material, the roll mill is adjusted (for example the distance between the cylinders of a calendar) such that the resulting floor covering strip obtains the desired layer thickness. In the linoleum floor coverings according to the invention, the thickness of the lower layer as described above is 0.6 mm to 1.4 mm.

Next, the linoleum sheet for the wear layer is produced which preferably is colored and/or patterned.

In the simplest case, particles of a suitable size of an electrically conductive filler can be spread into a uni-colored or multicolored linoleum mass for the wear layer, if desired together with particles of colored filler and the linoleum mass can be calendared into a linoleum sheet.

According to one embodiment, colored chips of a linoleum mass, which preferably contains electrically conductive filler, can be spread on linoleum sheets produced in this way and pressed into them.

Furthermore, according to one embodiment, a colored and patterned linoleum mass can be produced. For this purpose, mixed masses or base masses of different color are initially produced separately, rolled into sheets, and granulated. Afterwards, different colored granulates are mixed together and then fed to the roll mill (for example a calendar) and formed as a sheet. In special cases, the mixture of different colored granulates prior to application to the backing material is drawn into striped sheets, laid rotated 90° to each other and then calendared with friction, resulting in pattern forms known as such and suggestive of natural marble.

According to a further embodiment, sharp-contoured patterns can be achieved in that different rolled sheets are laid one over the other (doubled) and are brought into close contact and only afterwards are crumbled together. In so doing, particles are created which consist of two different parts which are adhering to each other. One part preferably consists of non-conductive mixed mass and the other part preferably consists of conductive mixed mass. The multiple layer composite of the rolled sheet for example can be granulated, cut, broken, or ground in order to produce the particles. Preferably the composite is processed into granulate. If these particles or the granulate of parts of differing mixed mass are now brought to a roll mill such as a calendar and are applied by rolling

onto a backing, an irregular pattern is obtained in which the variously colored zones hanging together and also zones of conductive and non-conductive material are delineated with sharp contours from each other and the colored zones are retained practically pure. These colored zones are bordered by the mixed mass which contain the conductive filler material and therefore is dark to black colored.

In addition to the above methods for producing a patterned linoleum sheet, all other conceivable methods can be used.

A rolled sheet of wear layer of this kind is then pressed with the lower layer into a two-layered linoleum floor covering.

Afterwards the two-layered linoleum floor covering is subjected to the curing treatment usual for linoleum floor coverings.

According to one embodiment of the method according to the invention, at least one, preferably web-like, back strip is applied to the back side of the floor covering. This imprint is preferably applied through a pressing process to the back side of the floor covering.

#### Example

A two-layer floor covering according to the invention was produced in that a lower layer and a wear layer were calendared onto a jute backing and the resulting composite was then cured. The compositions of the lower layer and the wear layer were selected as described in Table 1 below.

Leakage resistance  $R_A$  of the lower layer and leakage resistance  $R_A$  of the upper layer are also specified in Table 1.

Table 1

	Lower Layer	Upper Layer
Components	Content (% by weight)	Content (% by weight)
Cement	38.0	34.0
Sawdust	37.2	32.2
Carbon black, conductive	4.0	0.5
Titanium dioxide	--	7.9
Quaternary ammonium salt	6.7	6.7
Diatomite	2.4	4.0
Aluminum hydroxide	11.7	13.05
Pigments	--	0.85
Zinc oxide	--	0.8
Leakage resistance $R_A$ [Ohm] <sup>*)</sup>	$6 \times 10^3$ to $10 \times 10^3$	$2 \times 10^6$ to $10 \times 10^6$

Note: <sup>\*)</sup> Leakage resistance  $R_A$  was measured based on DIN 51 953, whereby in contrast to DIN 51 953, the upper and lower layers were not conditioned in accordance with the standard.

The composite of lower layer and wear layer had a contact resistance  $R_i$  per EN 1081 of  $1.9 \times 10^6$  to  $3.8 \times 10^6 \Omega$ .

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## Claims

1. Electrically conductive floor covering based on linoleum, comprising a wear layer (2), a lower level (3), and a backing (4), with the wear layer (2) comprising 0.1% to 5% by weight carbon black and/or 0.1% to 8% by weight metal powder in relation to the total weight of the wear layer (2), with the lower layer (3) containing as at least one electrically conductive filler material 1% to 20% by weight carbon black and/or 1.5% to 40% metal powder in relation to the conductive mixed mass, with the floor covering having a contact resistance  $R_1$  per EN 1081 (April 1998) of a maximum of  $10^7 \Omega$ .
2. Floor covering according to Claim 1, with the lower layer (3) having a thickness of 0.6 mm to 1.4 mm.
3. Floor covering according to Claim 1 or 2, with the wear layer (2) comprising a chemical additive for increasing conductivity.
4. Floor covering according to Claim 3, with the chemical additive being selected from morpholin and/or at least a derivative of imidazol, imidazolin, or benzimidazol or a mixture thereof.
5. Floor covering according to one of the preceding claims, with the wear layer (2) having a bright color.
6. Floor covering according to one of the preceding claims, with the wear layer (2) as such having a multicolor pattern.
7. Floor covering according to one of the preceding claims, with the wear layer (2) having a thickness of 1.4 mm to 3.6 mm.

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8. Floor covering according to one of the preceding claims, with an electrically conductive web (5) being arranged on the side of the backing (4) facing away from the lower layer (3).
9. Floor covering according to Claim 8, with the electrically conductive web (5) comprising an electrically conductive filler material.
10. Method for producing a floor covering based on linoleum according to one of Claims 1 through 9 comprising
  - the application of the lower layer (3) onto a backing (4) and
  - the forming of the wear layer (2) on the lower layer (3).
11. Method according to Claim 10 with at least one back coating in the form of an electrically conductive web (5) being applied to the back side of the floor covering.
12. Method according to Claim 11, with the web-like back coating (5) being applied through a press process.

CHANGED SHEET

**(12) NACH DEM VERTRAG ÜBER DIE INTERNATIONALE ZUSAMMENARBEIT AUF DEM GEBIET DES  
PATENTWESENS (PCT) VERÖFFENTLICHTE INTERNATIONALE ANMELDUNG**

**(19) Weltorganisation für geistiges Eigentum**  
**Internationales Büro**



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(84) **Bestimmungsstaaten (regional):** ARIPO-Patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW), eurasisches Patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), europäisches Patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI-Patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).

**Veröffentlicht:**  
— Mit internationalem Recherchenbericht.

*Zur Erklärung der Zweibuchstaben-Codes, und der anderen Abkürzungen wird auf die Erklärungen ("Guidance Notes on Codes and Abbreviations") am Anfang jeder regulären Ausgabe der PCT-Gazette verwiesen.*

**Veröffentlicht:**

— *Mit internationalem Recherchenbericht.*

*Zur Erklärung der Zweibuchstaben-Codes, und der anderen Abkürzungen wird auf die Erklärungen ("Guidance Notes on Codes and Abbreviations") am Anfang jeder regulären Ausgabe der PCT-Gazette verwiesen.*

**WO 01/25528 A1**

**(54) Title:** LINOLEUM FLOOR COVERING

**(54) Bezeichnung: LINOLEUMFUSSBODENBELAG**

**(57) Abstract:** The invention relates to an electrically conductive floor covering based on linoleum, comprising a wear layer and a sub-layer, whereby the floor covering has an electrical volume resistivity  $R_1$  according to EN 1081, of a maximum  $10^7 \Omega$ . The invention also relates to a method for producing said floor covering.

**(S7) Zusammenfassung:** Die vorliegende Erfindung betrifft einen elektrisch leitfähigen Bodenbelag auf Linoleum-Basis, welcher eine Nutzschicht und eine Unterschicht umfasst, wobei der Bodenbelag einen elektrischen Durchgangswiderstand  $R_1$  nach EN 1081 von maximal  $10^7 \Omega$  aufweist, und ein Verfahren zur Herstellung des Bodenbelags.

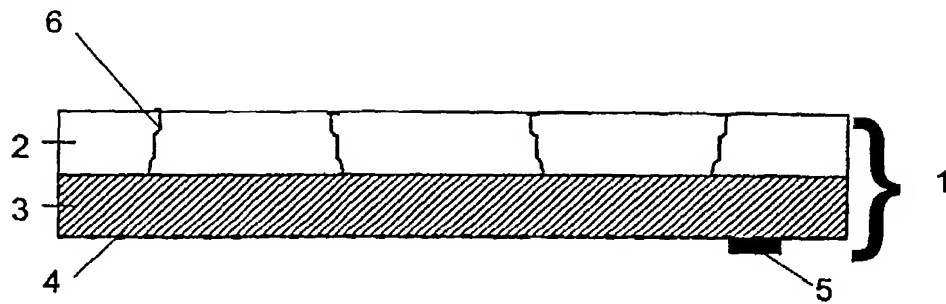


Fig. 1

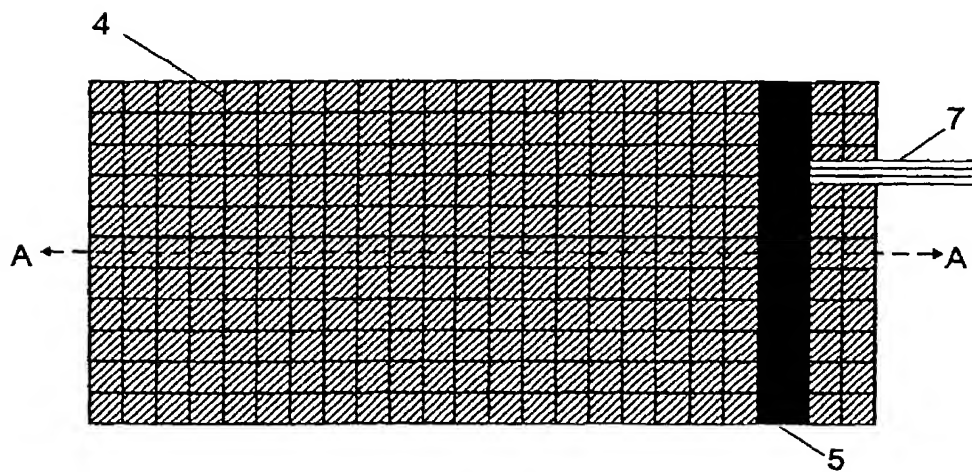


Fig. 2

**DECLARATION AND POWER OF ATTORNEY FOR PATENT APPLICATION**

As the below named inventors, we hereby declare that:

Our residence, post office address and citizenship are as stated below next to our names;

We believe we are the original, first and joint inventors of the subject matter which is claimed and for which a patent is sought on the invention entitled:

**LINOLEUM FLOOR COVERING**

the specification of which was filed on 6 October 2000 as Application Serial No. PCT/EP00/09830.

We hereby state that we have reviewed and understand the contents of the above-identified specification, including the claims.

We acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37, Code of Federal Regulations, §1.56(a).

We hereby claim any foreign priority benefits under Title 35, United States Code, §119 of any foreign application(s) and/or any international priority benefits under Title 35, United States Code, §365 based on the following foreign and/or international application(s) listed below, and also identify below any foreign and/or international application(s) for patent or inventor's certificate having a filing date before that of the application(s) on which priority is claimed:

Prior Foreign Application(s): German Application 19948406.6, Filed: 6 October 1999.

We hereby claim the benefit under Title 35, United States Code, §120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, §112, we acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, §1.56(a) which occurred between the filing of the prior application and the national or PCT international filing date of this application:

Prior Application(s): None.

We hereby declare that all statements made herein of our own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

(14)

We hereby appoint: Louis T. Isaf, Registration No. 29,078; James F. Vaughan, Registration No. 31,889; Steven D. Kerr, Registration No. 32,472; David Scott Sudderth, Registration No. 34,026; John J. Timar, Registration No. 32,497; Michael A. Cicero, Registration No. 34,562; Steven L. Schmid, Registration No. 39,358; David Hayzer, Registration No. 43,329; David S. Bradin, Registration No. 37,783; Jacquelyn D. Austin, Registration No. 43,478; Carl B. Massey, Jr., Registration No. 44,224; Brian J. Hairston, Registration No. 46,750; Thomas B. McGurk, Registration No. 44,920; and Kathleen Neuner Manne, Registration No. 40,101 having as their mailing address Womble Carlyle Sandridge & Rice, PLLC, P.O. Box 7037, Atlanta, Georgia 30357-0037, our attorneys jointly and severally, with full power of substitution and revocation, to prosecute this application, to make alterations and amendments therein, to receive the patent, and to transact all business in the Patent Office connected therewith, all correspondence to be directed to the said Thomas B. McGurk, Womble Carlyle Sandridge & Rice, PLLC, P.O. Box 7037, Atlanta, Georgia 30357-0037.

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Docket No: D078 1170.1

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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In re Patent Application of: )  
Szerreiks et al. )  
Application No: 10/088,983 )  
International Filing Date: October 6, 2000 )  
For: Linoleum Floor Covering ) Docket No.: D078 1170.1 )

**RESPONSE TO NOTIFICATION OF MISSING REQUIREMENTS UNDER 35 U.S.C. 371  
IN THE UNITED STATES DESIGNATED/ELECTED OFFICE (D0/EO/US)**

Assistant Commissioner for Patents  
P.O. Box Missing Parts  
Washington, D.C. 20231

Sir:

In response to the Notification of Missing Requirements Under 35 U.S.C. mailed May 14, 2002, Applicant submits the following: (1) Combined Declaration and Power of Attorney; (2) \$130.00 fee; and (3) Notification of Missing Requirements Under 35 U.S.C. 371.

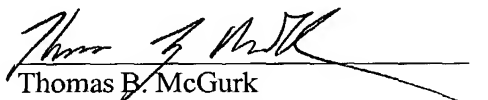
The Commissioner is hereby authorized to charge any fee deficiencies or credit any overpayment to our Deposit Account No. 09-0528.

Respectfully submitted,

06/07/2002 LLANDGRA 00000072 10088983

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130.00 DP

  
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I hereby certify that all correspondences listed above are being deposited for delivery to the above addressee, with the United States Postal Service "**EXPRESS MAIL POST OFFICE TO ADDRESSEE**" service under 37 CFR 1.10 on June 4, 2002. The envelope has been given U.S. Postal Service "Express Mail Post Office To Addressee" Package # **EL759080970**

